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has been replaced by King George V. Land; patriotic but a sad blunder.

The appreciation accorded to the Scott expedition excites reflections as to the contrasting attitude of the United States and of European governments towards scientific work that is neither commercialized nor exploited. Strikingly similar in aims, in accomplishment and in fateful disaster were the Lady Franklin Bay International Polar Expedition and Scott's Last Expedition. The former—a governmental enterprise—penuriously fitted, its scientific work largely entrusted to enlisted men—who were actuated largely by love of science—occupied the post of honor and of danger of the eleven cooperating nations. It contributed to a hitherto unequalled degree to arctic hydrography, meteorology, pendulum work and magnetism. Yet its complete success in its scientific purposes, as well as in field-work absolutely free from disaster, was formally requited neither by the government nor by any scientific societies of the United States. It took years of effort on the part of its chief to even obtain the meager lawful allowances and the pitiful pensions.

The English expedition, lavishly equipped, had 7 officers and 12 scientists, whose efforts also increase to a very large degree our scientific knowledge of Antarctica. Its heroic personnel win titles of nobility, promotions and the highest scientific honors, while the public contributed hundreds of thousands of dollars to meet adequately and generously all expeditionary requirements—both material and memorial.

The failure of our government to properly recognize scientific work appears to be due to an antiquated and inherited national policy, which must be to the ultimate detriment of the common weal. This year the attention of the government has been urgently called to untoward conditions, arising from illiberal treatment of expert officials. Distinguished chiefs of several important national bureaus officially report increasing difficulty in maintaining an efficient scientific staff. Unusual and steadily augmenting numbers of scientists and experts are accepting commercial posi-

tions in order to meet the enhanced cost of living.

While American admiration for the Scott expedition was so great that we materially aided in the raising of the memorial fund, our energies should also be employed in urging the adequate recognition of those scientific and professional officials, on whose skill, judgment, and patriotism the future of the democratic government in the western hemisphere must so largely rest.

A. W. GREELY

Probleme der physiologischen und pathologischen Chemie. Fünfzig Vorlesungen über neuere Ergebnisse und Richtungslinien der Forschung für Studierende, Ärzte, Biologen und Chemiker. By DR. OTTO VON FÜRTH. II. Band: Stoffwechsellehre. Leipzig, Verlag von F. C. W. Vogel, 1913. Pp. xiv + 717.

The only occasion for adding anything to the favorable impression of Professor von Fürth's lectures which the reviewer has already expressed¹ in reference to the first volume lies in the fact that the newer collection deals with a more specific group of topics: metabolism. The author's underlying plan consists in starting with the nutrients at the very beginning of the alimentary processes and in following the foodstuffs, as far as present knowledge permits, on their travels through the organism to the places where the final derivatives disappear in the unexplored depths of intermediary metabolism. To this is added a discussion of the nature of those ultimate stages of this physiological function which are characterized by the combustion of the food fragments in the living organism. In pursuance of the foregoing scheme the chemistry and physiology of digestion and absorption are reviewed in the light of those newer contributions which take cognizance of the special conditions that pertain in the alimentary canal, with its unique innervation and secretory interrelations.

The attitude of the critic to a contribution like the present one—a book giving evidence on every page of the remarkable familiarity of

¹ See SCIENCE, 1912,

the author with the enormous modern literature of chemical physiology and his sympathy with a treatment of its problems less narrow than is current in many quarters—can not be determined by the same criteria that apply to text-books or laboratory manuals. Von Fürth's lectures make no pretense to systematic formulation of routine topics; they offer something far more stimulating to the advanced student, namely, viewpoints to guide him, and goals to be reached. The limitations of our present knowledge are frankly pointed out. What could be more satisfying than this (freely translated) incidental confession of the author in presenting the subject of purine physiology:

"The sum total of the available observations is so vast that no honorable person, even if he devoted years of effort to this topic alone, could maintain that he had delved into the ultimate depths of the subject and fully mastered it. Yet how perverted it would be if I, who have not devoted myself permanently to this field, were simply to traverse it hastily, contenting myself with a few dogmatic statements. Bear in mind that I am merely attempting, in so far as my efforts permit me to appreciate it, to present to you a picture of this world of phenomena; and do not forget that this picture would appear different to other eyes. It is a human privilege to see the things of the external world with our own eyes; but we must not deceive ourselves into forgetting that it is, after all, a subjective point of view that we take."

Here, as in the first volume, there are personal touches and subjective impressions that lend a sort of enlivening color to the treatment of topics that the usual writer is apt to present in a stereotyped fashion. A few quotations may serve to illustrate what is here meant. The reviewer can not conceal his satisfaction in reading the following:

"Man hat sich vielfach bemüht, die moderne Entfaltung der physikalischen Chemie auch dem Probleme der Salzsäurebildung im Magensaft dienstbar zu machen. Als seinerzeit die Ionenlehre langsam in die biologischen Disziplinen einzusickern begann, konnte man

vielfach die Beobachtung machen, dass eine Übersetzung einer Fragestellung in die Sprache der Ionenlehre mit einer Erklärung verwechselt wurde. Heute ist man sich wohl ziemlich im Klaren darüber, dass, wenn ein Problem in noch so gelehrter Weise mit dem grösseren Publikum schwer verständlichen Fachausdrücken umschrieben wird, man seiner Erklärung nicht näher kommt, als wenn man dasselbe etwa in spanischer oder russischer Sprache formuliert. Leider ist hie und da ein Restchen der Bemühungen mittelalterlicher Magister, durch möglichste Schwerverständlichkeit ihrer hochgelehrten Darstellungen ihrem Auditorium nur so recht zu imponieren, auch noch in der modernen Wissenschaft (insbesondere in der medizinischen) zu verspüren" (p. 10).

The author's attitude toward many open questions is expressed in the concluding sentence of a discussion of the purpose of the complete digestion of proteins to amino acids.

"Dass aber ein Individuum, trotzdem es die allerverschiedensten Proteinsubstanzen mit seiner Nahrung aufnimmt, stets und unter allen Umständen und sein ganzes Leben lang die Spezifität seiner körpereigenen Eiweisskörper in allerstrengster Weise zu wahren vermag, kann ich nur so verstehen und begreifen, dass ich mir vorstelle, jeder Eiweisskörper der Nahrung werde vor der Assimilation sehr wahrscheinlich bis zu den Aminosäuren desintegriert. Doch ist das eine durchaus subjektive Meinung, die ich Sie nur als solche hinzunehmen bitte. Schliesslich kann ja jeder Mensch nur mit seinem eigenen Kopfe denken" (p. 73).

Similarly at the end of an excellent review of the theories of gout, in which he champions Wiechowski's views, von Fürth remarks:

"Es ist mir wohl bekannt, dass andere diese Dinge anders beurteilen;—aber, wie ich schon früher einmal sagte: jeder Mensch kann nur mit seinen eigenen Augen sehen und mit seinem eigenen Kopfe denken. Glücklicherweise kommt jedes naturwissenschaftliche Problem früher oder später in ein Stadium, wo allen subjektiven Auffassungen ein natürliches Ende gesetzt ist und der objektive Sachverhalt

als etwas Selbstverständliches erscheint" (p. 171).

The welcome touches of humor creep in here and there, as in the following conclusion:

"Dagegen ist die Frage der Herkunft endo- und exogener Harnpurine, nachdem allerdings ganze Ströme von Tinte für sie geflossen sind, immerhin so weit gediehen, dass sie (—und das ist immer ein gutes Zeichen—) eigentlich mit wenigen Worten erledigt werden kann" (p. 150).

Again:

"Es macht nun den Eindruck, dass dieses (bisher wenig beachtete) Moment einer beim Gichtiker gesteigerten Affinität der Gewebe der Harnsäure gegenüber dem Kerne des Gichtproblems näher steht, als z. B. die Frage der Harnsäurebindung im Blute, welche so viel Staub aufgewirbelt hat, und mit der wir uns jetzt auch notgedrungen ein wenig beschäftigen müssen" (p. 175).

And in advising a liberal intake of water in gout the author recognizes that he is merely repeating the dicta of empirical practise. Hence he reflects:

"Es wäre hier, wie überall, durchaus unangebracht und verkehrt, wenn wir das, was nüchterne und objektive Beobachter mit ehrlichem Bemühen bei jahrzehntelanger Beobachtung für zweckmässig befunden haben, einfach ignorieren wollten, weil wir dafür keine theoretische Erklärung zu finden wissen. Vergessen wir nie, dass die Beobachtungen richtig und die Theorien falsch sein können und dass ein richtiger Naturforscher die ersteren im allgemeinen höher bewertet als die letzteren. Nur ist das objektive Beobachten insbesondere bei der Therapie chronischer innerer Erkrankungen leider eine unendlich schwierige Sache, daher dieselbe zu allen Zeiten und bei allen Völkern das gelobte Land der wissentlichen und unwissentlichen Charlatanerie war und sein wird" (p. 190).

The admonition to caution, on the other hand, in rejecting the suggestions of science is brought out in a discussion of Friedenthal's proposal to render the common vegetables more readily available in the nutrition of man. Von Fürth writes:

"Der Wunsch, Menschen zu Gras- und Blätterfressern zu machen, mag Ihnen vielleicht auf den ersten Blick recht lächerlich erscheinen. Vergessen Sie aber nicht, dass es nicht immer die schlechtesten Errungenschaften des Menschengeschlechtes waren, (—ich erinnere Sie an die Dampfmaschine, das Leuchtgas und die Elektrizität—), welche in ihren ersten Anfängen von der Mehrzahl der Zeitgenossen nur von der humoristischen Seite aufgefasst worden sind. Vielleicht stehen wir hier vor einer jener Möglichkeiten, das Dasein späterer Generationen leichter zu gestalten, als es den jetzt Lebenden zuteil geworden ist" (pp. 480–481).

It is of little value to refer here to the details of a book so replete with up-to-date information and so readable at the same time. A typical specimen of the care and comprehensiveness with which the facts have been collected and reviewed is furnished by the discussion of the rôle of muscle in glycolysis. The entire story is told from the early work of Cohnheim, through the critique of Embden and his coworkers, to the latest constructive criticism of Levene and Meyer. An example of the intelligent reconciliation of conflicting views is exhibited in the discussion of the origin of endogenous urinary purines:

"Wir werden uns daher bemühen, uns von jeder einseitigen Auffassung fernzuhalten und weder die Leukozyten, noch die Muskeln, noch die Tätigkeit der Verdauungsdrüsen oder Nieren für die endogene Harnsäurebildung ausschliesslich verantwortlich machen, dieselbe vielmehr als den Ausdruck einer jederzeit und in allen Geweben sich vollziehenden Zellabnutzung betrachten" (p. 151).

Von Fürth is at his best in the discussion of the special features of alimentation and the intermediary metabolic phenomena. His treatment of the problems and methods of general metabolism—the balance of matter and energy—is far less detailed, yet always timely. The unbiased attitude is nowhere better shown than in the comments on the status of the much debated questions of the protein minimum in human nutrition and the theories of protein metabolism:

“Es sind dies eben Dinge, die sich wirklich gegenwärtig nicht, ohne gegen das Postulat der Objektivität zu sündigen, mit wenigen Worten abtun lassen. Ein Blick auf Casparis Literaturverzeichnis, das mehr als ein halbes Tausend Abhandlungen umfasst, wird Ihnen zeigen, dass ich darin recht tue” (pp. 475-476).

In conclusion the reviewer is tempted further to quote the judgment of von Fürth respecting the duty of an investigator to correlate his own experiences so that they afford a logical summary of his undertaking. Thus in referring to the myriad of details published in recent years by London and his pupils on the physiology and chemistry of the digestive functions von Fürth remarks:

“Ich bin ehrlich genug, um offen einzugehen, dass ich mich einer Würdigung dieser ungeheuren Fülle von sicherlich sehr verdienstvollen Einzelbeobachtungen nicht gewachsen fühle. Eine solche wird wohl erst dann möglich sein, wenn London selbst sich einmal der Mühe unterzieht, dieselben im Zusammenhange kritisch zu verarbeiten und seine leitenden Gedanken, die auf so viele Publikationen verteilt sind, dass der Aussenstehende den Zusammenhang verlieren muss, hervorzuheben. Es ist dann zu hoffen, dass sich aus diesen und anderen Arbeiten, welche verwandten Zielen zustreben allmählich ein abgerundetes Bild des Eiweissabbaues im Darne in seinen einzelnen Phasen gestalten wird” (p. 71).

To those who wish to orient themselves in the changing aspects of physiological research, particularly its chemical manifestations, the lectures by von Fürth will surely serve as a stimulating guide. Books of this type are rare.

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Alternating Currents and Alternating Current Machinery. By D. C. and J. P. JACKSON. New York, The Macmillan Company, 1913. Pp. viii + 968, 521 text figures. Price, \$5.50.

This new edition of a well-known work furnishes one of the best general treatments on the subject of alternating currents, as did the first edition in 1896. Rewritten and expanded

to twice its former size, it forms a very complete and, on the whole, well-balanced treatise. The work is attractive, the style easy and the illustrations, many of them diagrammatic, are instructive. Descriptive and mathematical discussions are combined throughout, and examples from practice are used to illustrate theory.

Attempting to cover so much in a single volume assigns a formidable task to both author and reader. Although on the whole satisfactory, the treatment might to advantage have been made more systematic; the book would not have suffered by being more condensed. The chapters on synchronous machines (185 pages) and on transformers (155 pages) approach special treatises on these subjects. The latter would be improved by complete rearrangement, the discussion of mutual induction forming not so suitable an introduction to the transformer, in a book of this kind, as would a discussion of diagrams and equivalent transformer circuits that are discussed later in the chapter. The discussion of power and power factor is particularly satisfactory and complete.

That the authors omitted many historical footnotes seems unfortunate. Such notes not only serve to give credit where it may be due, but they make possible for the reader a more detailed study of special subjects than the limited description of any one text will permit. The footnotes retained (and these are not a few) prove their value. The authors refer in their preface to the intentional omission of many notes on the ground that they are unessential for undergraduates. But the scope of the book justifies no such limitation; its field is much wider than the undergraduate class-room. The book should find many readers whose undergraduate days have long since passed. The authors are to be thanked for its production.

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